

Zlatko Kvaček (1937 – 2020)

We were shocked as we received the news of Zlatko's passing. We were already planning to visit him during the upcoming summer, or at least to come together to celebrate his 85th birthday, as we did his 80th a few years ago. We are still not able to overcome his passing – he will be greatly missed for years to come.

For decades Zlatko Kvaček was a distinguished person in the palaeobotanical research community. Even in the 1970s and '80s his work was widely known internationally, even though he worked and lived behind the iron curtain. His knowledge and results were extraordinary; accordingly, he was recognized first by western Europe, and then in North America and Asia. He produced these results while remaining always a nice and humble person, who was encouraging but not pushy. Palaeobotany was his life, and he prioritised helping young researchers starting their careers in this field, not only in the Czech Republic, but also in the neighbouring countries of Central Europe.



Professor RNDr. Zlatko Kvaček, DrSc. during the Conference organised in occasion of his seventies in Prague, National Museum, July 2007 (photo by F. Trnka)

Zlatko Kvaček was born on July 28, 1937 in Prague, as the second child of the physician Dr. Jiří Kvaček and Marie Kvačková. In his childhood, he was already interested in the natural sciences; he prepared his own herbarium, influenced by his grandfather, who was a school principal. In his high school years, he met his future wife, Hanka. They were married on July 6, 1961, and this loving relationship lasted for 59 years, until his recent passing. The marriage gave them two children, Jiří and Lucie.

Zlatko began studying at the Faculty of Science of Charles University in Prague in 1958. He received his diploma in geology, and his diploma thesis was already about palaeobotany: "Tertiary plant remains from the Julius Fučík Mine, in Želénky near Duchcov." From 1960 to 1963 he was employed as a geologist in the mining company Geologický průzkum n. p. Dubí, where he worked in the exploration of non-coal resources. From 1963 to 1965 he was a graduate student at the Institute of Geology of the Czechoslovak Academy of Sciences (ČSAV) in Prague. During that time, he worked on his Ph.D. thesis under the supervision of Prof. Dr. František Němejc. In 1966, he defended his Ph.D. dissertation, entitled "Evolution of brown coal swamp flora in Bohemia during the late Tertiary." He worked for ČSAV until 1991. In the meantime, in 1985, he defended his DrSc. thesis on "Cuticle analysis of Neogene trees from Central Europe" at the Academy's Institute of Geology and Geotechnology.

Since 1991, Zlatko was active in the Faculty of Sciences at Charles University, first as an Associate Professor, then promoted to full Professor in Palaeobotany in 1998. He retired in 2003, but the scientific world could not notice it, because he continued to publish an abundance of scientific papers and participated in several international conferences. During his 80th birthday celebration, one of his students, Jakub Sakala, pointed out that Zlatko's publication activity between his 70th and 80th year was comparable to an active young scientist. Zlatko always worked in a team – almost all of his publications have multiple authors. At the beginning of his career, he worked with his excellent colleges in Prague: Ervín Knobloch, Čestmír Bůžek and František Holý. Unfortunately, none of them are alive today; they passed away a long time ago. His palynology co-worker, Magda Konzalová with whom he co-authored numerous papers, thankfully is still with us. Later Zlatko established many international connections. His oldest and longest palaeobotanical collaborations were with Prof. Harald Walther from Dresden and Prof. Dieter Mai from Berlin, which also turned into strong, life-long friendships. The authors of this obituary were also honoured to work with him for many decades.

Lilla Hably's Memories of Zlatko Kvaček

In 1977 Zlatko organized an international conference, “Advances in Angiosperm Palaeontology” at Liblice Castle in Bohemia, at that time still behind the iron curtain. This was my first experience of participating in such a conference, and it inspired me to continue in this field of study. Many palaeobotanists participated in this conference, not only from western and eastern Europe, but also from the USA. This was the first time that palaeobotanists from the East and West met, since earlier palaeobotanical conferences were only available for the western world. Later, he also organized several symposia. His major event was the 7th European Palaeobotany-Palynology Conference in Prague in 2006.

At first, he was able to build collaborations only within the so-called socialist countries. Based on his excellent work, he was invited into western countries as well, where he studied and revised not only the fossil Tertiary flora, but also searched for comparisons in the recent herbaria. He knew many of the European collections. He was fond of saying, “The best locality is the collection”. He had an amazingly retentive memory. He not only remembered in which collection he saw a certain fossil or taxon, but many times even the actual cabinets. He also had an extraordinarily detailed memory for the properties of each taxon.

The application of cuticle analysis in Tertiary palaeobotany is also a major theme of his work. Whenever available, he investigated the epidermal anatomy of fossil leaf specimens, and he encouraged others to do so as well, while he also acknowledged the limitations of this method. He prepared the samples by himself, which is a very time-consuming task. One of his main areas of focus, the revision of older collections applying cuticle analysis, resulted in international collaborations, especially in the descriptions of Tertiary floras. He was an excellent taxonomist. His research projects resulted in the publication of important monographs on Palaeogene and Neogene Taxaceae, Fagaceae, Juglandaceae, Platanaceae, Theaceae and Ericaceae from Central Europe, including the investigation of gross-morphology and cuticular analysis of fossil and living taxa, as well as



Text-fig. 1. Zlatko Kvaček with his colleague Čestmír Bůžek in the field in Žichov, 1975. Archive J. Kvaček.

comprehensive floristic monographs of particular localities such as Kundratice, Bechlejšovice, Markvartice, Veselíčko, Staré Sedlo, Bilina and several others. We are not able to list all his results and conclusions – they can be found in his bibliography. Zlatko had always two important principles in mind, which were often neglected by earlier generations. First, the identification of real botanical affinities of the fossils, for which he used cuticular analysis whenever possible. The second, adhering to the nomenclatural rules.

Zlatko's research projects have also been focused on taphonomical and palaeoecological aspects of fossil sites, with a particular aim to reconstruct the Tertiary vegetation and environment. In addition, Zlatko took part in other international projects, like the “IUBS Plant Fossil Record” and the “Database of Palaeogene and Neogene European Neogene Floras”.

Zlatko Kvaček is the most well-known European palaeobotanist, but his name is familiar to palaeobotanists all over the world. First of all, he studied Tertiary and Late Cretaceous floras of the Czech Republic, but later engaged

in the investigation of localities from all over Europe and even North America. His scientific interest covered a wide range of topics and methods. He published more than 200 papers. In 2018, he won the Honorary Membership award of the International Organization of Palaeobotany, which could not have gone to a more fitting person.

His loveable personality and his good sense of humour fascinated all around him, because he was not only a world famous palaeobotanist, but also an excellent teacher, husband, father and grandfather.

It was more than 43 years ago, in 1977 that I first met Zlatko Kvaček. After graduating from the university, I was granted a month's study visit to Prague in the scope of the cooperation between the Hungarian and Czechoslovak Academies of Sciences. At that time, study trips were allowed only to the so-called socialist countries, and I chose Prague. The palaeobotanical department of the Czechoslovak Academy of Sciences was located in Spálená street, no. 49, which, we already knew, was the

focus of palaeobotany in the 1970s. In fact, Prague itself was a well-known palaeobotany centre. Besides Zlatko, I should mention Magda Konzalová, Čestmír Bůžek, František Holý and Ervín Knobloch – all worked here at that time. In spite of the political isolation of this era, they were all outstanding palaeobotanists, and they made contacts with colleagues not only from other parts of Europe but also from overseas. Well, I got acquainted with cuticular analysis here in Spálená 49. I learned from Zlatko how to prepare fossil cuticles. Later I turned to him with several palaeobotanical questions via mails, which is unimaginable now for the young colleagues – it took 2–3 weeks to have answers to questions. We arranged our projects and study trips in this way.

By means of bilateral projects between the Academies in the 1980s and 1990s, I could travel to Prague for a week each year, which was a real professional refreshment for me. We could discuss palaeobotanical questions which arose through the year. Later Zlatko paid visits to Hungary nearly every year, which even my family waited for; the world-famous scientist even played with my little children!

We worked mostly on Oligocene and Pliocene floras of Hungary, but together visited other palaeobotanical sites also from the Miocene age, like Ipolytarnóc and Magyaregregy. Together, we collected fossils from the early Oligocene flora of Eger-Kiseged, and from the completely new Pliocene palaeobotanical sites in Gérce and Pula. It was hard field work during many hot summer days under the burning sun. We studied together the collected material, the result of which was a monograph. Zlatko visited several palaeobotanical collections of Hungary. He worked generally in the Botanical Department of the Hungarian Natural History Museum, since he was interested in the famous collection of Prince Lobkowitz, containing lots of type specimens from Ettingshausen's monograph on the localities around Bílina in the Czech Republic. He studied numerous taxa, like *Sloanea*, *Bytneriophyllum*, *Platanus neptuni*, *Tilia*, *Comptonia*, *Berberis*, *Ilex* and several others. Moreover, he also investigated Eocene materials in the Geological Institute of Hungary, and identified and revised many specimens from Eger, Wind-brickyard in the collection of the Mátra Museum.

Dear Zlatko! It is really painful to bid farewell to You! It is still incomprehensible that You have gone, but we keep You in our memories forever! In my early career you kindly helped me, giving lots of energy. I am very beholden to You for being helped, for knowing you, for learning from you and for calling you not only my teacher but also my friend!

Johanna Eder's Memories of Zlatko Kvaček

In September 1980, while I was a student and had just started to work on my PhD, I spent four weeks in Prague to study palaeobotany and to learn cuticle analysis with Zlatko Kvaček. At that time, this was a rare chance for a student from a western country, and it became possible by a scholarship from the Austrian Academy of Sciences. At this time, Zlatko's lab was hosted in a flat in Spálená 49 close to the Václavské náměstí and the National Museum. It was my first day in Prague; it was foggy, nevertheless I was wondering why the windows of the lab looked frosty white instead of transparent. Zlatko explained me that the glass had turned white from working with hydrofluoric acid, which he frequently used to dissolve sediment adhering to the leaf remains. He would put the samples between the double glass windows. This was my first long-lasting impression from Prague. In the following weeks, Zlatko offered me without reservation all his broad knowledge that could be relevant for my thesis and I soaked/absorbed all information. Zlatko had studied geology, but he also had a remarkably broad botanical knowledge in taxonomy, plant sociology and ecology. The monograph of Ervín Knobloch and Zlatko Kvaček on the Miocene flora from the western margin of the Bohemian Massif was already published, and Zlatko held photoprints of the leaves and cuticles, which he offered me because their quality was better than the printed plates. These pictures were extremely useful for my studies and I still keep them as reference.

During this stay Zlatko arranged meetings with the late Čestmír Bůžek and František Holý. He also organised a field trip to Maxim Gorkij mine in North Bohemia. Although in those days it was not at all usual to invite colleagues from the other side of the iron curtain to one's home (registration at official hotel was required), Zlatko and Hanka were extremely kind hosts, inviting me for meals together at their flat. At this occasion I also met first Jiří, Zlatko's and Hanka's son who was a pupil. From this time onwards I first visited Zlatko almost regularly every year in Prague to perform comparative studies, and after the opening of the iron curtain in 1989, Zlatko also regularly visited Vienna to perform studies in the palaeobotanical collection and the herbarium at the Natural History Museum, as well as in the Geologische Bundesanstalt and the Institute of Botany at the University of Vienna. Zlatko passionately worked in many foreign collections, in Europe, N. America and China. The opening of the iron curtain must have been a mental liberation for him, which eventually offered him the possibility to further broaden his expertise and to network his immense numerous pieces of botanical and palaeobotanical knowledge. This development fostered Zlatko's incredible productivity in publishing.

The flora of Parschlug is one of the most important Neogene ones, because it is extremely diverse, and numerous fossil-species were described by Franz Unger and Constantin von Ettingshausen in the 19th century. Large collections are hosted by different



Text-fig. 2. Zlatko Kvaček with Lilla Hably, Maria Barbacka and two preparators from the Botanical Department of the Hungarian Natural History Museum at the entrance of Ipolytarnóc Fossils Protected Area, 1999. Archive L. Hably.

institutions in Austria and abroad. The revision of this flora was a tremendous effort, and we jointly visited different collections. Zlatko's famous memory and sovereignty in nomenclature were essential to perform this revision, which we published in 2004.

Zlatko was very open-minded to new ideas, and unbogoted to collaboration. This is evident from the wide array of his co-authors. With the start of automatic data processing, in the late 1980s, a database of Palaeogene and Neogene floras of Eurasia was started. Zlatko did not hesitate at all to get acquainted with a personal computer and to contribute with the input of data for Czech localities. We put strong emphasis on high and updated taxonomical resolution of the data. Colleagues from many European

countries joined in, among them Harald Walther, Dieter Mai, Ewa Zastawniak, Lilla Hably, Rázvan Givulescu, Emanuel Palamarev, Yuri Teslenko to mention only a few. They provided data that became the basis for several collaborative studies in the following years. Zlatko also strongly supported the idea to develop a semiquantitative method based on leaf physiognomy and putative autecology of fossil taxa to assess major vegetation features, and to visualise the results by geographically mapping them. This attempt was further developed into the Integrated Plant Record (IPR) vegetation analysis, which was first published in 2007, and since then has been applied and developed further.

Thanks to Zlatko's abilities and enthusiasm as university teacher, the Czech and the Slovak republics can be proud of a next generation of palaeobotanists with complementary specialisation: Jakub Sakala (fossil wood), Vasilis Teodoridis (fruits, quantitative evaluations to assess climate and vegetation), Jiřina Dašková, Nela Doláková, Marianna Kováčová (Tertiary pollen), Jana Zajícová, Helena Soukupová (Tertiary plants), Jiří Kvaček (Zlatko's son, Mesozoic, Tertiary and Quaternary flora, and head of



Text-fig. 3. Zlatko Kvaček with Johanna Eder-Kovar and Gary Upchurch during the conference *Advance in Palaeobotany in Gainesville, Florida, March 2006*. Photo Ch. M. Kampny.

the Department of Palaeontology, National Museum), Jana Čepičková (Cretaceous plants), Josef Pšenička, Milan Libertín (Carboniferous plants). I am not aware of other countries that can be proud of such a well-established palaeobotanical community – dating back to the time of Kaspar Sternberg.

Apart from science, I experienced many enjoyable evenings with Zlatko and Hanka in their flat, where Hanka always prepared delicious Czech dishes, even when she must have been tired after a full day's work as dentist. On such occasions, we communicated in a peculiar mixture of German, Czech, Russian and English.

We all know about our finiteness, nevertheless it is hard to accept it. We are deeply mourning that Zlatko has left us for ever. Dear Zlatko, please accept our sincere thanks, for all you taught us, for all you showed us, and simply for having had the chance to be friends with you.

Steven Manchester's Memories of Zlatko Kvaček

My first regular communications with Prof. Zlatko Kvaček were by airmail as I became interested in various genera shared between the Tertiary of central Europe and western North America. Together with Čestmír Bůžek in 1988, we began working on *Pteleacarpum* fruits shared between Oregon and Bohemia, which he later found to match with the living Asian genus *Craigia*. We would send typewritten versions of the manuscript back and forth by airmail for reciprocal editing and eventually succeeded with co-authored publications at a time when collaboration between eastern and western block countries was still very limited and slow. Other projects included *Tetraclinis* foliage and cones and *Platanus neptuni* leaves and infructescences, all similarly shared between North America and Europe. He kindly invited me to visit Prague on an exchange visit funded both by US National Research Council and Czechoslovak Academy of Sciences in 1989. He not only shared the facilities of his lab and museum collections, but introduced me to other colleagues in Prague, notably Ervín Knobloch, Čestmír Bůžek, Magda Konzalová and facilitated my examination of various collections. He and his wife Hanka were so welcoming. This gave me the opportunity to meet his son Jiří for the first time, who was at that time in high school – resulting in another long-lasting friendship.

During my exchange visits in Prague, Zlatko volunteered to take me on long road trips in his car to visit other European colleagues and collections. In this way we travelled together, with the opportunity to meet Mr. Zdeněk Dvořák at the Bílina Mine headquarters, Harald Walther in Dresden, Leon Stuchlik and Eva Zastawniak in Krakow and Johanna Eder in Vienna, and received permission to study the historical collections of Franz Unger in Graz. We each took along our film cameras and portable stands in order to photograph specimens pertinent to our various floristic and taxonomic projects. He also gave me good advice and paved the way for me to meet other paleobotanists with whom new collaborations developed, for example Mikhail Akhmetiev, Lilla Hably, Dieter Mai and Edoardo Martinetto.

Zlatko's abilities with cuticle preparation are legendary. Drawing on his knowledge of chemistry, as well as his experience with trying various different approaches, he developed procedures for maceration of modern and fossil cuticles that would give excellent results. This required not only methodological expertise, but special networking skills to obtain the necessary chemical reagents that could be very difficult to access during local communist times. Later, when Zlatko was visiting Gainesville,

I complained that I had found a fern-like leaf that I suspected to be cycad, but could not get good results from the cuticle. The cuticle was peeling of the rock, seemingly well preserved, but my macerations could not resolve the cell outlines. He offered to help and took my unsatisfactory preparations into our chemistry lab to process by his own methods. In less than 30 minutes he returned with beautiful preparations: “I think you did not leave it long enough in the nitric acid”. This led us to see that we had discovered a new species of *Eostangeria* – the first recognition of this genus from North America, which previously was known only from the Geiseltal of Germany.

My basic education lacked formal training in Latin, so I was always relying on Zlatko’s help for composing new species epithets with the proper suffixes to comply with gender of the generic name. Nevertheless, you will find in my publications some

mistakes of Latin – instances where I forgot to ask Zlatko to kindly double check my Latin composition.

Zlatko helped me in writing a successful collaborative proposal to the US National Science Foundation that funded some of our activities in 1997 – 2000: “U.S.-Czech paleobotanical research on Tertiary plant disjunctions of North America and Europe”. This facilitated exchange visits in both directions, and I was happy to have the opportunity to host him and Hanka in travels across the US. We had a memorable trip to Yellowstone National Park, followed by visits to various Paleogene localities in Wyoming and Montana, including camping trips with Hanka volunteering as our chef in the field!

I was impressed by Zlatko’s advanced knowledge of the places we were visiting, and what he could teach me about the vegetation and geology of my own country, as well as his insights when we would visit paleobotanical collections of various museums across the US and Europe.

I enjoyed participating in the celebratory symposium on the occasion of Zlatko’s 80th birthday in 2017, and was eager to see him again on occasion of the International Organization of Palaeobotany Conference that had been scheduled for this year, September 2020. Through a sad sequence of events, this meeting was postponed due to the Covid-19 pandemic, and Zlatko has not lived for us to celebrate him in person. I am not prepared, emotionally, to accept that he has left us. This year we co-authored our nineteenth paper together – a treatment of Paleocene Trochodendraceae fruits and foliage that features his expertise on epidermal anatomy. I



Text-fig. 4. Zlatko Kvaček and Steven Manchester at Snowbird, Utah conference 2009. Photo by D. K. Kappate.

am so thankful for his guidance and encouragement over the years. Another thing that impressed me about Zlatko was his enduring loyalty to colleagues. He very often completed the manuscripts of friends who had perished before him, like Holý, Bůžek, Knobloch and Walther. Now it is up to us to carry on and to help with the projects and aspirations that he, himself, could not complete.

Lilla Hably, Budapest
Johanna Eder, Stuttgart
Steven Manchester, Gainesville